

Claims

1. A cell division-visualized cell which is obtained by the introduction into a host cell of three or more kinds of fusion genes obtained by allowing fusion of three or more kinds of genes of proteins that constitute a cell structure which reflects the situation of cell division, and genes of fluorescent proteins of the different kind, respectively.

2. The cell division-visualized cell according to Claim 1 wherein said cell structure which reflects the situation of cell division is at least two kinds of nucleus, chromosome, nuclear membrane, centrosome, centromere, spindle, cytoskeleton, heterochromatin and telomere.

3. The cell division-visualized cell according to Claim 1 wherein said protein that constitutes a cell structure which reflects the situation of cell division is at least two kinds of histone H3, histone H2B, importin α , lamin B, aurora A, aurora B, α -tubulin, β -tubulin, γ -tubulin, centromere protein A, centromere protein C, heterochromatin protein 1, survivin, actin, and a telomere protein.

4. The cell division-visualized cell according to Claim 1 wherein said fluorescent proteins are two kinds or three or more kinds of green fluorescent proteins, cyan fluorescent proteins, red fluorescent proteins and yellow fluorescent proteins.

5. The cell division-visualized cell according to Claim 1 wherein said host cell is a cell derived from a mammal.

6. The cell division-visualized cell according to Claim 5 wherein said cell derived from a mammal is a somatic cell, a germ cell or an ES cell of a mammal.

7. A cell division-visualized cell which is obtained by the introduction into a transformed cell obtained by the introduction into a host cell of two or more kinds of fusion genes that are obtained by allowing fusion of two or more kinds of genes of proteins that constitute a cell structure which reflects the situation of cell division and genes of fluorescent proteins of the different kind, respectively, of a fusion subject gene in which a subject gene is fused with a gene of a fluorescent protein of a different kind from that of said fluorescent proteins.

8. The cell division-visualized cell according to Claim 7 wherein said cell structure which reflects the situation of cell division is at least two kinds of nucleus, chromosome, nuclear membrane, centrosome, centromere, spindle, cytoskeleton, heterochromatin and telomere.

9. The cell division-visualized cell according to Claim 7 wherein said protein that constitutes a cell structure which reflects the situation of cell division is at least two kinds of histone H3, histone H2B, importin α , lamin B, aurora A, aurora B, α -tubulin, β -tubulin, γ -tubulin, centromere

protein A, centromere protein C, heterochromatin protein 1, survivin, actin, and a telomere protein.

10. The cell division-visualized cell according to Claim 7 wherein said fluorescent proteins are two kinds or three or more kinds of green fluorescent proteins, cyan fluorescent proteins, red fluorescent proteins and yellow fluorescent proteins.

11. A method of the production of a stable cell division-visualized cell which comprises:

(1) obtaining a fusion gene by allowing fusion of a gene of a protein that constitutes a cell structure which reflects the situation of cell division and a gene of a fluorescent protein, and then

(2) introducing three or more kinds of said fusion genes of which fluorescent protein being the different kind into a host cell.

12. A method of the production of a stable cell division-visualized cell which comprises:

(1) obtaining a fusion gene by allowing fusion of a gene of a protein that constitutes a cell structure which reflects the situation of cell division and a gene of a fluorescent protein, then

(2) introducing two or more kinds of said fusion genes of which fluorescent protein being the different kind into a host cell to obtain a transformed cell, and thereafter

(3) introducing a fusion subject gene in which a subject gene is fused with a gene of a fluorescent protein of a different kind from that of said fluorescent proteins, into said transformed cell.

13. A method of the detection of fluorescence which comprises:

(1) obtaining a fusion gene by allowing fusion of a gene of a protein that constitutes a cell structure which reflects the situation of cell division and a gene of a fluorescent protein, then

(2) introducing three or more kinds of said fusion genes of which fluorescent protein being the different kind into a host cell to obtain a cell division-visualized cell, and thereafter

(3) allowing expression of said fluorescent proteins to detect fluorescence derived from said fluorescent proteins during cell division of said cell division-visualized cell in a time dependent manner.

14. A method of the detection of fluorescence which comprises:

(1) obtaining a fusion gene by allowing fusion of a gene of a protein that constitutes a cell structure which reflects the situation of cell division and a gene of a fluorescent protein, then

(2) introducing two or more kinds of said fusion genes

of which fluorescent protein being the different kind into a host cell to obtain a transformed cell, thereafter

(3) introducing a fusion subject gene in which a subject gene is fused with a gene of a fluorescent protein of a different kind from that of said fluorescent proteins, into said transformed cell to obtain a cell division-visualized cell, and then

(4) allowing expression of said fluorescent proteins to detect fluorescence derived from said fluorescent proteins during cell division of said cell division-visualized cell, in a time dependent manner.

15. A method of the evaluation of an influence upon cell division which comprises:

(1) culturing the cell division-visualized cell according to Claim 1 in the presence of a subject substance, and then

(2) carrying out the observation of the state of cell division by detecting fluorescence generated through allowing expression of said fluorescent proteins during cell division of said cell division-visualized cell.

16. A method of the evaluation of an influence upon cell division which comprises:

(1) culturing the cell division-visualized cell according to Claim 7, and then

(2) carrying out the observation of the state of cell

division by detecting fluorescence generated through allowing expression of said fluorescent protein derived from said fusion subject gene during cell division of said cell division-visualized cell.

17. The method of the evaluation of an influence upon cell division according to Claim 15 wherein said cell division is mitosis and/or meiosis.

18. The method of the evaluation of an influence upon cell division according to Claim 15 wherein the observation of the state of cell division is carried out by dynamic visualization through taking an image by chronological photographing of said cell division-visualized cell during cell division under a fluorescence microscope or a laser microscope while culturing of said cell division-visualized cell.

19. A method of the screening which comprises selecting a subject substance which exerts an influence upon cell division by performing the method of the evaluation of an influence upon cell division according to Claim 15.

20. A method of the screening which comprises selecting a gene which exerts an influence upon cell division by performing the method of the evaluation of an influence upon cell division according to Claim 16.